



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/571,602	10/26/2006	Paolo Massino Buscema	59836-140	9802
35743	7590	07/28/2008	EXAMINER	
KRAMER LEVIN NAFTALIS & FRANKEL LLP INTELLECTUAL PROPERTY DEPARTMENT 1177 AVENUE OF THE AMERICAS NEW YORK, NY 10036				BROWN JR, NATHAN H
ART UNIT		PAPER NUMBER		
2129				
			NOTIFICATION DATE	DELIVERY MODE
			07/28/2008	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

klpatent@kramerlevin.com

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/571,602	BUSCEMA, PAOLO MASSINO	
	<b>Examiner</b>	<b>Art Unit</b>	
	NATHAN H. BROWN JR	2129	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE (3) MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 05 May 2008.
- 2a) This action is **FINAL**.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 13-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 13-28 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ .                                    |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ .  | 6) <input type="checkbox"/> Other: _____ .                        |

### Examiner's Detailed Office Action

1. This Office Action is responsive to the communication for application 10/571,602, filed May 5, 2008.
2. Claims 13-28 are pending. Claims 13-16, 18, 19 are currently disclosed as amended. Claims 1-12 are cancelled. Claims 17, 20-26 are previously presented. Claims 27 and 28 are new.
3. After the previous office action, claims 13-26 stood rejected.

### Claim Rejections - 35 USC § 112, 2<sup>nd</sup>

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 13-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Amended independent claim 13 recites "said neural network is implemented in a computer having a processor and memory". Examiner finds no disclosure of "a computer having a processor and memory" in the Specification. Claims 14-28, depending from claim, incorporate the new matter and are also rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

6. Claims 13-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Amended independent claim 13 recites "said neural network is implemented in a computer having a processor and memory". Examiner finds no

disclosure of "a computer having a processor and memory" in the Specification. Therefore, how "said neural network is implemented in a computer having a processor and memory" cannot be described in the Specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claims 14-28, depending from claim, incorporate the new matter and are also rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement.

### Claim Rejections - 35 USC § 101

7. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

8. Claims 13-27 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter: abstraction and/or algorithm. Amended independent claim 13 recites:

"A neural network, comprising: a plurality of nodes forming at least two layers, a first such layer being an input layer and a last such layer being an output layer, said input layer nodes and said output layer nodes being

communicably connected...wherein said neural network is implemented in a computer having a processor and memory...".

Examiner considers the neural network disclosed in amended independent claim 13 to be no more than a mathematical abstraction or algorithm as no computer hardware implementing said neural network is disclosed. Further, claim 13 recites that "input data from a database" is transformed to produce a final result of, "output data provided to a user". Examiner considers such "output data" to be abstract, since it is never disclosed that the neural network is every trained to solve a specific and credible real-world problem nor that the input data is from a real-world problem domain. Claim 13 is therefore considered to recite only the 101 judicial exceptions of abstraction and/or algorithm and to be non-statutory under 35 U.S.C. 101. Claims 14-27 provide detailed mathematical limitation of claim 13 without curing the deficiency of claim 13. While claim 27 recites "input data...acquired from a real world phenomenon, process or measurement", no specific and credible benefit is disclosed as resulting from processing this data with the claimed neural network, thus this data is considered to be merely *types of data* that could be processed. Thus claims 13-27 are considered non-statutory under 35 U.S.C. 101.

9. Claims 13-27 are rejected under 35 U.S.C. 101 because the claimed invention violates the doctrine of preemption. Amended independent claim 13 recites a mathematical model (or computational structure) well known to be a class of model that utilizes Kolomogorov's theorem concerning the realization of arbitrary multivariate functions, considered able to approximate any continuous real-valued function. Further, Applicant limits claim 13 with claim 27, reciting "input data...acquired from a real world phenomenon, process or measurement, or is designed to model, represent, approximate or express a real world phenomenon, process or measurement." Clearly, claims 13 and 27 are directed toward a general computational capability able to form models of any conceivable thing (represented in relational domains or vectors) using an arbitrary multivariate function able to approximate any continuous real-valued transformation. Examiner considers this inventive arrangement to clearly violate the doctrine of preemption. Since claims 14-26 depend from claim 13 without curing the deficiency of claims 13 and 27, claims 13-27 are considered non-statutory under 35 U.S.C. 101.

10. Claim 28 is rejected under 35 U.S.C. 101 because the claimed invention has no real world application. Independent claim 28 recites a "program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform" the method of claim 13. Since claim 13 is considered to be directed to abstraction and/or algorithm, claim 28 is considered not to produce a credible and specific result to a real-world problem. Therefore, claim 28 is considered non-statutory under 35 U.S.C. 101.

### Response to Arguments

11. Applicant's arguments filed May 5, 2008 have been fully considered.

#### Rejection of Claim 13 Under 35 U.S.C. §101

Applicant argues:

Claim 13 has been amended to recite that the claimed neural network is implemented in a computer having a processor and memory and that the output data is provided to a user. Thus, Applicant submits, the claimed neural network is directed to a novel processing structure implemented in a real world device, a computer. Such a device allows a user to have better, more reliable and faster convergence of the algorithm to the best solution and avoiding also local minima during a learning phase. The claimed neural network can take as input a set of data from

Art Unit: 2129

a database, such as, for example, an input vector, and output a nonlinear transformation of a nonlinear transformation of said input data. The output data can then be provided to a user, such as, for example, via a display or a file, or both.

Given these amendments, Applicants respectfully request that the 35 U.S.C. § 101 Rejections be removed. The claimed computer implemented neural network is not an abstract algorithm, but rather a tangible computational structure. As such, claim 13 does not violate the doctrine of preemption. An abstract algorithm is not claimed. A specific computational structure implemented in a computer is. Such computational structures implemented in computers are well known, and highly useful for a variety of computational tasks. Such structures can be seen as specialized computational systems implemented in software.

Examiner responds:

Examiner fails to find "a computer having a processor and memory" or a "display" disclosed in the Specification that would suggest that the claimed neural network is directed to a processing structure implemented in a real world device (i.e., a computer). Further, Examiner considers a result such as a "better, more reliable and faster convergence of the algorithm to the best solution and avoiding also local minima during a learning phase" to be a solution to a class of general problems in machine learning, rather than a specific and credible real-world problem (e.g., face recognition).

Applicant comes to disclosing a real-world problems with the breast cancer database analysis (see

Specification, pp. 30-31) and the Australian Credit Scoring database analysis. However, it is noted that the purpose of running the neural network with data from the breast cancer database was to "analyse capabilities of the network according to the present invention with regard to the over-fitting properties", in the first case, and "to perform an "Early Stopping" approach to reduce the over-fitting phenomenon", in the second case. It is noted that the purpose of running the neural network with data from the Australian Credit Scoring database was to compare "between a classic Back-propagation network BP and the network according to the present invention SN on the Australian Credit Scoring dataset, with "Early Stopping" (Training-Testing-Prediction) and without (Training- Prediction )".

All of these implementations are considered to be applications of the neural network to solving research problems in machine learning, rather than a real-world problem. Thus, claim 13 is considered to remain directed toward abstraction and/or algorithm and to be non-statutory under 35 U.S.C. §101.

Rejection of Claim 13-26 Under 35 U.S.C. §102(b)

Applicant argues:

...in Lin, at no output layer nodal processing is there a prior nonlinear transformation sub-step performed before the summing of inputs to that output layer. I.e., at the nodal processing of the hidden layer, there is no nonlinear transformation prior to performing the step  $\text{net}_q = \text{Sum}\{V_{qj}X_j\}$ , and at the nodal processing of the output layer there is no nonlinear transformation prior to performing the summing step  $\text{net}_i = \text{Sum}\{w_{iq}Z_q\}$ .

In the claimed invention there is such a pre-summing sub-step (i.e., sub-step A(i)), in addition to the nonlinear processing after such summing, (i.e., step B).

Thus, the claimed invention is submitted as patentable over Lin, and similarly, over all prior art classical artificial neural networks.

Examiner responds:

Examiner finds Applicant's argument persuasive and withdraws the rejection of Claim 13-26 Under 35 U.S.C. §102(b) over *Lin*.

### Conclusion

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this

action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

### Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan H. Brown, Jr. whose telephone number is 571-272- 8632. The examiner can normally be reached on M-F 0830-1700. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Vincent can be reached on 571-272-3080. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval

Art Unit: 2129

(PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/David R Vincent/  
Supervisory Patent  
Examiner, Art Unit 2129

Nathan H. Brown, Jr.  
July 25, 2008